

Detectors with Improved Near-to-Mid IR Performance and Reduced Cooling Requirements, Phase I

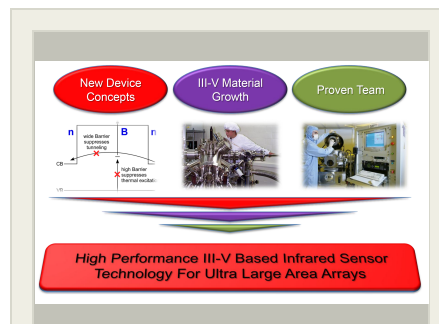
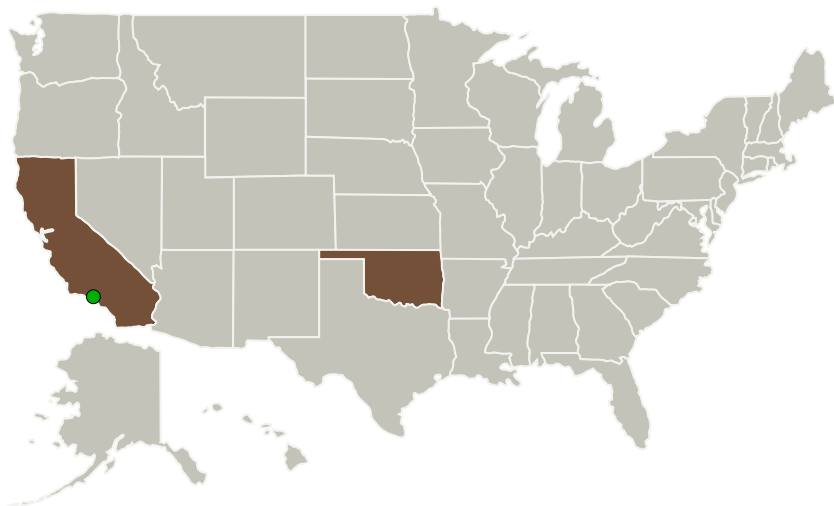
Completed Technology Project (2013 - 2014)



Project Introduction

This STTR Phase I proposal addresses a NASA need for improved near-to-mid IR detectors for imaging and spectroscopy. High performance IR detectors with cutoff wavelengths in the range of 2.5 – 5.0 microns will be developed using InGaAs / AlAsSb semiconductor materials. The proposal uses a two-pronged approach to address the problem of detector performance degradation by materials' defects, both "grown in" defects and defects caused by radiation damage. The project will apply an advanced device architecture, the nBn detector, which has been shown to be extremely successful in other IR detectors for suppression of defect-related dark current and noise. Additionally, the project will apply our proprietary defect mitigation technology, which passivates defects via UV hydrogenation treatments. The result of this program will be near-to-mid IR detectors with higher performance, reduced cooling requirements, and improved radiation hardness. These detectors are compatible with integration into mega-pixel IR imaging arrays for imaging 2.5 – 5.0 micron wavelengths with improved performance and reduced cost, which will be produced in Phase II. Amethyst has teamed with the University of Oklahoma and FLIR Systems to ensure that this technology can be readily transitioned to meet NASA mission requirements.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Amethyst Research Inc.	Lead Organization	Industry Women-Owned Small Business (WOSB)	Ardmore, Oklahoma
● Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California
University of Oklahoma-Norman Campus	Supporting Organization	Academia	Norman, Oklahoma

Primary U.S. Work Locations

California	Oklahoma
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Project Transitions

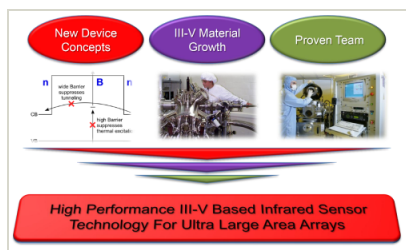
▶ **May 2013:** Project Start

✓ **May 2014:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/140488>)

Images



Project Image

Detectors with Improved Near-to-Mid IR Performance and Reduced Cooling Requirements
(<https://techport.nasa.gov/image/132742>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Amethyst Research Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

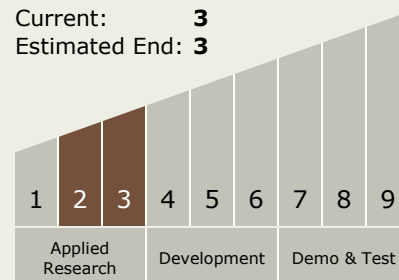
Carlos Torrez

Principal Investigator:

Orin W Holland

Technology Maturity (TRL)

Start: 2
Current: 3
Estimated End: 3



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Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.1 Remote Sensing Instruments/Sensors
 - └ TX08.1.1 Detectors and Focal Planes

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System